

### ABSTRACT

Methods of fabricating semiconductor devices are disclosed. One example method includes forming a gate oxide and a gate electrode on a semiconductor substrate; performing a first ion implantation process for the formation of an LDD (lightly doped drain) region in the substrate; forming spacers on the sidewalls of the gate electrode; performing a second ion implantation process for the formation of a junction region in the substrate using the spacers as mask; forming a trench for device isolation by removing selectively the top portion of the substrate between the spacers; forming a sidewall oxide layer on the resulting substrate; forming a diffusion barrier on the sidewall oxide layer; depositing a gap filling insulation layer over the diffusion barrier; planarizing the gap filling insulating layer; and removing selectively some part of the gap filling insulation layer to form contact holes.